

→ Unit (6.2)

Preparing Detailed Specifications of Item (Cement Concrete 1:2:4) in Civil Engg. Works —

(a) Materials —

① Coarse aggregate —

The aggregates, most of which passes through 75 mm IS sieve and retained on 4.75 mm I.S. sieve are termed as coarse aggregates. The maximum & minimum size of coarse aggregate is 75 mm and 4.75 mm respectively.

② Fine aggregate —

The aggregates most of which passes through 4.75 mm IS sieve and retained on 75 microns (i.e. 0.075 mm) IS sieve as fine aggregates. The fine aggregates are helpful in filling up the voids of coarse aggregates. The fine aggregates may be natural sand or crushed stone sand.

③ Cement —

Cement shall be fresh Portland (OPC) cement of ISI specification
PTD

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shall have the required compressive strength (33 N/mm^2)
Fineness (It residue does not exceed 10% when tested on IS sieve no 9).

(4) Water —

(a) Water shall be clean and free from alkaline and acid matters suitable for drinking water.

(b) Proportion —

The proportion of concrete shall be 1:2:4 as ~~concrete~~ cement: sand: coarse aggregate by volume unless otherwise specified.

The compressive strength of concrete should not be less than 15.5 kg/cm^2 ^(15.2 N/mm^2) a

Coarse aggregate and sand shall be measured by volume with boxes.

Cement need not be measured by box. One bag cement (50 kg) should be considered as 0.1 cu m .

Size of box may be $35 \text{ cm} \times 35 \text{ cm} \times 28 \text{ cm}$ or $30 \text{ cm} \times 30 \text{ cm} \times 38 \text{ cm}$ equivalent to content of one bag of cement. All materials shall be dry. Bulking allowance shall be made for wet sand.

Mixing shall be of machine mixing, for small work hand mixing by batches may be allowed.

(1) Machine mixing —

Coarse aggregate, sand and small be put into the mixer in required proportion. For concrete 1:2:4 proportion first four box of stone chips (coarse aggregate, two boxes of sand and then one box or one bag cement shall be put into the mixer. The machine shall then be revolved to mix material dry and then water shall be added gradually to the required quantity, 25 to 30 liters per bag of cement to get the required water cement ratio.

The mixing should get a plastic mix of uniform colour.

It requires $1\frac{1}{2}$ to 2 minutes rotation for ~~thorough~~^{thorough} mixing. Mixed concrete shall be unloaded on a masonry platform or on a iron sheet.

(2) Hand mixing

For small work it hand mixing is allowed. Then mixing shall be done in masonry platform or iron sheet. For concrete 1:2:4 proportion, —
1st ~~to~~ 02 boxes of sand and

One bag cement shall be mixed dry thoroughly and then this dry mix of cement and shall be placed over a stack of four (04) boxes Stone Chips (loose aggregate and the whole mixed dry turning at least three times to have uniform mix. Water shall then be added slowly and gradually with water ~~can~~ while being mixed to the required quantity 25 to 30 liters per bag of cement, to give a plastic mix of the required workability and water cement ratio.

The whole shall be mixed thoroughly turning at least three times to get a uniform concrete.

(3) Slump Test —

Regular slump test should be carried out to check the workability and to control the addition of water. A Slump of 7.5 cm to 10 cm may be allowed for building work and 4 cm to 3 cm may be allowed for road work.

(4) Form work —

~~Formwork~~ Form work and centering shall be provided as per standard specifications before laying concrete

to confine to support or to keep the concrete in position. The inner surface of formwork shall be oiled to prevent concrete sticking to it. The base and formwork over which concrete to be laid shall be watered before concrete is laid.

Forms should ~~not~~ not be removed before 14 days is general, however side forms may be removed ~~after~~ after 3 days. Formworks shall be removed slowly and carefully without disturbing and damaging concrete.

⑤ Laying —

Concrete shall be laid gently in layers not exceeding 15 cm and compacted by ~~pinning~~ pinning ~~with~~ with rods and tamping with wooden tampers or with mechanical vibrating ~~material~~ ^{inserting} until a dense concrete is obtained.

For thick concrete or mass concrete immersion type vibrators and for thin concrete surface vibrators or form vibrators should be used. Over-vibration resulting in segregation should be avoided.

Concrete shall be laid continuously, if laying is suspended for rest or for the following day, the end shall be sloped at an angle of 30°

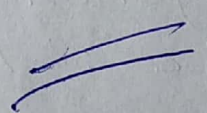
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and made rough for further jointing. When the work is resumed, the ~~for~~ previous sloped portion shall be roughened, cleaned, watered, and a grout of neat cement shall be applied and fresh concrete shall be laid for successive layers the upper layer shall be laid before the lower has set.

(6) Curing. —

After about two hours laying when concrete has begun to harden, it shall be kept by covering with wet gunny bags for 24 hours, and then cured by flooding with water making mud walls 7.5 cm high or by covering with wet sand, continuously for 15 days.

(7) Measurement —

The measurement should be taken for the exact dimensions as per drawings or as per instructions of the engineer.



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The drawings and specifications are the two important contract documents.

- Without specifications the tender documents are incomplete and invalid.
- The provision in the specifications are given more legal strength and most of the contract state that in case of discrepancy (Tazija) between the drawing and specifications, the provision of the specifications shall govern.
- Specifications also serves as an useful legal document in case of disputes between the owner/ Department and the contractor.